REMARKS

This Amendment responds to the Office Action dated July 16, 2003 in which the Examiner rejected claims 1-7, 9-15 and 17-20 under 35 U.S.C. §103 and objected to claims 8 and 16 as being dependent upon a rejected base claim but would be allowable if rewritten in independent form.

Concurrently filed with this Amendment are formal drawings. It is respectfully requested that the Examiner acknowledges the formal drawings.

As indicated above, claims 1, 4, 10 and 13 have been amended to make explicit what is implicit in the claim. It is respectfully submitted that the amendment is unrelated to a statutory requirement for patentability and does not narrow the literal scope of the claims.

Claim 1, 4, 10 and 13 claim a digital camera that records a captured image as digital data. The digital camera comprises an image pickup device, an A/D converter, a recording device, a data processor and a display device. The data processor interpolates for missing pixels for each color or component using a first process. An external device interpolates for missing pixels for each color or component using a second process which is different from the first process.

Through the structure of the claimed invention having a data processor which interpolates for missing pixels using a first process and having an external device interpolate for missing pixels using a different process, as claimed in claims 1, 4, 10 and 13, the claimed invention provides a digital camera in which the image can be immediately

displayed on a display unit so that the user can preview the image. The prior art does not show, teach or suggest the invention as claimed in claims 1, 4, 10, and 13.

Claims 6 and 14 claim a method for recording and displaying an image comprising the steps of; the first, sensing an image with an image sensor having an array of pixels. Each pixel generates data relating to one of a plurality of colors or components. Next, both data generated by the individual pixels of the image sensor and information which describes the colors or components that are associated with the individual pixels are simultaneously stored at a first site. The stored data and stored information from the first site are then transmitted to a second site. The data at the second site is interpolated in accordance with the stored information to generate complete color or image data for the individual pixels. Finally, the image is reproduced in accordance with the complete color or image data.

Through the method of the claimed invention simultaneously storing data which is generated by the individual pixels and information which describes the arrangement of the individual pixels relative to different components or colors as claimed in claims 6 and 14, the claimed invention provides a method for recording and displaying an image which reduces the load on the recording medium data storage capacity. The prior art does not show, teach or suggest the method as claimed in claims 6 and 14.

Claims 1-5 and 10-13 were rejected under 35 U.S.C. §103 as being unpatentable over *Rashkovskiy et al.* (U.S. Patent No. 6,181,376) in view of *Konishi* (U.S. Patent No. 4,574,319).

Rashkovskiy et al. appears to disclose in FIG. 2 a block diagram of a digital camera having a color filter image stored in a memory. Digital Camera 10 uses Lens 12 to accept light from the environment around the camera. The light passes through and is filtered by Color Filter Array 13 and is sensed by electronics Sensors 14. The resulting Color Filter Image 16 is stored in Memory 18. The Sensors may be CCDs, CMOS arrays, or other light sensing devices. The Color Filter Image is a representation of the image sensed by the camera. Memory 18 is coupled to Interfaces (I/F) 20, 22 to connect Digital Camera 10 to a Computer System 24 for displaying the captured images. Computer System 24 is a general purpose computer such as a personal computer (PC) or workstation having a Processor 26, Memory 28, and a Display 30. The Color Filter Image 16 generated by Digital Camera 10 is stored as Color Filter Image 16' in Memory 28 in Computer System 24 and manipulated as a result of instructions being executed by Processor 26. (Col. 3, line 61 through col. 4, line 11)

Thus, *Rashkovskiy et al.* merely discloses a digital camera 10 connected to a computer system 24 having a processor 26. Nothing in Rashkovskiy et al. shows, teaches or suggests a digital processor interpolates for missing pixels using a first process and an external device interpolates for mising pixels using a different process as claimed in claims 1, 4, 10 and 13. Rather, *Rashkovskiy et al.* merely discloses a separate computer system 24 which is external to the digital camera 10.

Konishi appears to disclose when the image is formed on the image pickup device 5, each photoelectric conversion picture element constituting the image pickup device 5 generates an electric signal according to the light intensity received thereat, and temporarily

stores the electric signal. The electric signal stored in the photoelectric conversion cells is then sequentially output from a scanner 6 to a signal processor 7. The signal processor 7 has an amplifier, a quantizer or the like, and performs processing operations such as amplification, encoding or the like of the electric signal fed from the scanner 6. The electric signal thus processed is then recorded on a recording medium 10, which is releasably fitted on a recorder 9, as the image data is recorded by the recorder 9 according to a synchronizing signal generated by a synchronizing signal generator 8. (Col. 3, lines 50-65) The addresses of defective picture elements of the image pickup device 5, information on the arrangement of the color filter array provided on the surface of the image pickup device 5, or the like, are already fixed when the image pickup device 5 is manufactured. Data of this type may for example be output as the data for compensation in image reproduction when the data is recorded on the recording medium by use of a ROM (read only memory) for encoding and storing these data in the data memory 13. The above-mentioned code for discriminating between continuous shooting and single frame shooting modes of the photographed image may be recorded by using the members for indicating these modes in the camera body, or may be automatically recorded by detecting the shutter operation. The camera body 2 is also provided with a shutter button 16, view finder 17 or the like as in the case of a conventional camera. The above-described various data to be recorded together with the image data are input to the recording medium as described below. For example, information on defective addresses for indicating the positions of defective picture elements of the image pickup device 5, information on the arrangement of the color filter array provided on the surface of the image pickup device 5, information which is already fixed when the image pickup device

5 is manufactured and which effects all image information recorded, the code for keeping the whole record secret, or the like, are automatically recorded by the ROM for encoding and storing these types of information in the data memory 13 when the loading of the recording medium 10 into the camera body 2 is detected. Or, such information is manually input to the recording medium 10 by use of the manual data input unit 14 after recording medium 10 loaded into the camera body 2. (Col. 4, line 56 through Col. 5, line 23)

Thus, *Konishi* merely discloses a camera including a signal processor which performs processing operations on the electrical signal fed from a scanner 6. Nothing in *Konishi* shows, teaches or suggests a data processor which interpolates for missing pixels using a first process and an external device that interpolates for pixels using a different process as claimed in claims 1, 4, 10 and 13. Rather, *Konishi* merely discloses a signal processor which performs processing operations.

A combination of *Rashkovskiy et al.* and *Konishi* would merely suggest to replace the digital camera 10 of *Rashkovskiy et al.* with the electronic camera of *Konishi* and to output the information to the computer system 24 of *Rashkovskiy et al.* Thus nothing in the combination of *Rashkovskiy et al.* and *Konishi* shows, teaches or suggests a) a data processor that interpolates for missing pixels using a first process and an external device that interpolates pixels using a different process as claimed in claims 1, 4, 10 and 13. Therefore, applicant respectfully requests the Examiner withdraws the rejection to claims 1, 4, 10 and 13 under 35 U.S.C. §103.

Claims 2-3, 5, and 11-12 depend from claims 1, 4 and 10 and recite additional features. It is respectfully submitted that claims 2-3, 5 and 11-12 would not have been

obvious within the meaning of 35 U.S.C. §103 over *Rashkovskiy et al.* and *Konishi* at least for the reasons as set forth above. Therefore, applicant respectfully requests the Examiner withdraws the rejection to claims 2-3, 5 and 11-12 under 35 U.S.C. §103.

Claims 6-7, 9, 14-15, 18 and 19 were rejected under 35 U.S.C. §103 as being unpatentable over *Rashkovskiy et al.* in view of *Konishi* and further in view of *Parulski et al.* (U.S. Patent No. 5,040,068).

Applicant respectfully traverses the Examiner's rejection of the claims under 35 U.S.C. §103. The claims have been reviewed in light of the Office Action, and for reasons which will be set forth below, it is respectfully requested that the Examiner withdraws the rejection to claims and allows the claims to issue.

As discussed above, *Rashkovskiy et al.* merely discloses storing a color filter image 16 in a memory 18. Nothing in *Rashkovskiy et al.* shows, teaches or suggests simultaneously storing a) data which is generated by individual pixels and b) information which describes the colors that are respectively associated with the individual pixels or which describes the arrangement of the individual pixels relative to different components as claimed in claims 6 and 14. Rather, *Rashkovskiy et al.* merely discloses that light, having passed through a color filter array 13, is sensed by sensors 14 and the resulting color filter image 16 is stored in memory 18.

As discussed above, *Konishi* merely discloses automatically recording different types of information in a data memory when the recording medium 10 is loaded into the camera body 2 (column 5, lines 6-23). Nothing in *Konishi* shows, teaches or suggests simultaneously storing data generated by individual pixels of an image sensor and

information which describes colors associated with the individual pixels or which describes the arrangement of the individual pixels relative to different components as claimed in claims 6 and 14. Rather, *Konishi* discloses that information is stored about the arrangement of the color filter array when the recording medium 10 is loaded into the camera body 2.

Parulski et al. appears to disclose an electronic imaging apparatus separable into a plurality of modular components. (Col. 1, lines 7-9) Referring initially to FIG. 1, electronic imaging apparatus is divided generally into an image recording unit 2 and a pair of interchangeable image pickup units 4a and 4b, one each for the acquisition of monochrome and color images. (Col. 3, lines 19-22) The analog image signals are applied to the terminal 10a located in the terminal block 10. The horizontal and vertical clocks needed for driving the image sensor 6 are input through the terminal 10b and over (one or more) line(s) 12 to the image sensor 6. Coding means 14 provides an identifying signal to the terminal 10c for identifying the image pickup unit 4a according to the characteristics of the image sensor 6 included therewith; that is, the identifying signal signifies that the image pickup unit 4a provides a monochrome signal. (Col. 3, lines 31-61) The image pickup unit 4a is replaced with the image pickup unit 4b when acquisition of a color image is desired. Besides the image sensor 6, the coding means 14, and the terminal block 10, the image pickup unit 4b additionally includes a color filter array 20 positioned over the photosensitive surface of the image sensor 6 in the path of image light. The sensor 6, when clocked from the terminal 10b, consequently provides a sequence of color-dependent signals to the terminal 10a corresponding to the particular color pattern of

the array 20. Accordingly, the identifying signal provided by the coding means 14 signifies that the image pickup unit 4b provides a color image signal. In addition, the identifying signal may specify the type of color filter array pattern (e.g., the "three green" pattern), as this information is useful in the subsequent signal processing to separate the respective colors. (Col. 4, lines 1-19) When the pickup unit 4a (or 4b) is attached to the recording unit 2, the respective circuits are completed between pickup terminals 10a, 10b, 10c and recording terminals 32a, 32b, 32c, which forms an interface for transferring signals between the pickup unit 4a (or 4b) and the recording unit 2. The analog image signals present on the terminal 32a are applied to an A/D converter 34, which generates a digital image signal from the analog input signal for each picture element. The digital signals are applied to an image buffer 36, which is a random access memory (RAM) with storage capacity for all, or a part of, a still picture. The horizontal and vertical clocks needed for driving the sensor 6 are generated by a timing generator 38 and applied to the terminal 32b. The identifying signal present on the terminal 32c is applied to a control processor 40. (Col. 4, lines 33-49) The control processor 40 decodes the identifying signal and generally controls the recording unit 2 and the image pickup unit 4a (or 4b) by initiating and controlling exposure (by instructing the control element 42 to operate the diaphragm 26 and the shutter 28), by controlling operation of the timing generator 38, and by enabling the A/D converter 34 in conjunction with the image buffer 36 for each signal segment relating to a picture element. (Col. 4, lines 53-61) In particular, the identity of the pickup unit (monochrome or color) is obtained from the identifying signal and output to the display section 48 for display as a corresponding message. The control processor 40

also calculates proper exposure conditions (shutter, aperture) based on the ambient light 52a sensed by a light measuring circuit 52 and the photographic speed of the image sensor 6 (as provided by or inferred from the identifying signal from the coding means 14). The control processor 40 further directs the digitized image signals to a detachable memory module 54 via a connector 56. The memory module 54 may be tethered to the image recording unit 2 via a cable (not shown) or it may be fitted to mate with the connector 56 on the recording unit 2. (Col. 4, line 68 through Col. 5, line 14)

Thus, *Parulski et al.* merely discloses a coding means 14 which provides an identifying signal to identify whether an image pickup unit 4a or image pickup unit 4b is attached to an image recording unit 2 and a control processor 40 which decodes the identifying signal to control the image pickup unit 4a or 4b. Thus nothing in *Parulski et al.* shows, teaches or suggests simultaneously storing data generated by individual pixels and information which describes the colors associated with the individual pixels or which describes the arrangement of the individual pixels relative to different components as claimed in claims 6 and 14. Rather, *Parulski et al.* merely discloses a controller which uses an identifying signal in order to control sensors 4a, 4b.

A combination of *Rashkovskiy et al.*, *Konishi* and *Parulski et al.* would merely suggest that in the digital camera 10 of *Rashkovskiy et al.* to load information when the recording medium is loaded as taught by *Konishi* and to control the pickup device based upon an identifying signal as taught by *Parulski et al.* Thus nothing in the combination of *Rashkovskiy et al.*, *Konishi* and *Parulski et al.* shows, teaches or suggests simultaneously storing data generated by individual pixels and information which describes colors

associated with the individual pixels or which describes the arrangement of the individual pixels relative to different components as claimed in claims 6 and 14. Therefore, applicant respectfully requests the Examiner withdraws the rejection to claims 6 and 14 under 35 U.S.C. §103.

Claims 7, 9, 15, 18 and 19 depend from claims 6 and 14 and recite additional features. It is respectfully submitted that claims 7, 9, 15, 18 and 19 would not have been obvious within the meaning of 35 U.S.C. §103 over *Rashkovskiy et al.*, *Konishi* and *Parulski et al.* at least for the reasons as set forth above. Therefore, it is respectfully requested that the Examiner withdraws the rejection to claims 7, 9, 15, 18 and 19 under 35 U.S.C. §103.

Claim 17 and 19 were rejected under 35 U.S.C. §103 has being unpatentable over *Rashkovskiy et al.* in view of *Konishi* and further *Lathrop* (U.S. Patent No. 6,288,743).

Applicants respectfully traverse the Examiner's rejection of the claims under 35 U.S.C. §103. The claims have been review in light of the Office Action, and for reasons which will set forth below, Applicants respectfully request the Examiner withdraws the rejection to the claims and allows the claims to issue.

As discussed above, since nothing in the combination of the primary references shows, teach or suggest the primary features as claimed in claim 1 and 10, it is respectfully submitted that the combination of the primary references with the secondary reference will not overcome the differences of the primary reference. Therefore, it is respectfully requested that the Examiner withdraws the rejection to claims 17 and 19 under 35 U.S.C. §103.

Since objected to claims 8 and 16 depend from allowable claims, it is respectfully requested that the Examiner withdraws the objection thereto.

Thus it now appears that the application is in condition for reconsideration and allowance. Reconsideration and allowance at an early date are respectfully requested.

If for any reason the Examiner feels that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed within the currently set shortened statutory period, applicant respectfully petitions for an appropriate extension of time. The fees for such extension of time may be charged to our Deposit Account No. 02-4800.

In the event that any additional fees are due with this paper, please charge our Deposit Account No. 02-4800.

Respectfully submitted,

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Date: November 13, 2003